VAA-Weekly-Progress

11/06-11/12

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Context

- Last week, trained models with varied datasets (full Ap10k, bovidae+cervidae, only bovidae) and decided that we need to normalize for dataset size to see the true effect of the dataset on model performance
- Created a proposal for identifying visually similar species through limb ratio similarity
- Brainstormed a layout for the research poster

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Goals

Training/Testing: bring down to size of bovidae set (1169 annotations (some images have more than 1 animal) training, 140 annotations validation)

- Bovidae+Cervidae - Medha
- Full AP10k - Claire
- Full Ap10k without B+C - Shaan

Poster Draft Assignments:

- Overview - Armaan, Aryan
- Implications - Parth
- Training Data - Shaan
- Generalizability - Medha, Claire
- Future Work (Both Sections) - Josh

Everyone - Labeling

Bovidae+Cervidae

Original Split

Bovidae Data Split

Species	Training (num of annotations)	Validation (num of annotations)
argali sheep	110 (9.4%)	10 (7.14%)
bison	268 (22.93%)	34 (24.29%)
buffalo	208 (17.79%)	25 (17.86%)
cow	228 (19.5%)	31 (22.14%)
sheep	355 (30.37%)	40 (28.57%)
Total	1169	140

Bovidae+Cervidae Data Split

Species	Training (num of annotations)	Validation (num of annotations)
argali sheep	110 (7.1%)	10 (5.08%)
bison	268 (17.29%)	34 (17.26%)
buffalo	208 (13.42%)	25 (12.69%)
cow	228 (14.71%)	31 (15.74%)
sheep	355 (22.9%)	40 (20.3%)
moose	175 (11.29%)	27 (13.71%)
deer	206 (13.29%)	30 (15.23%)
Total	1550	197

Bovidae+Cervidae Resized

Bovidae+Cervidae Original Data Split

Species	Training (num of annotations)	Validation (num of annotations)
argali sheep	110 (7.1%)	10 (5.08%)
bison	268 (17.29%)	34 (17.26%)
buffalo	208 (13.42%)	25 (12.69%)
cow	228 (14.71%)	31 (15.74%)
sheep	355 (22.9%)	40 (20.3%)
moose	175 (11.29%)	27 (13.71%)
deer	206 (13.29%)	30 (15.23%)
Total	1550	197

Bovidae+Cervidae New Data Split

Species	Training (num of annotations)	Validation (num of annotations)
argali sheep	83 (7.1%)	7 (5.08%)
bison	202 (17.29%)	24 (17.26%)
buffalo	157 (13.42%)	18 (12.69%)
cow	172 (14.71%)	22 (15.74%)
sheep	268 (22.9%)	28 (20.3%)
moose	132 (11.29%)	19 (13.71%)
deer	155 (13.29%)	21 (15.23%)
Total (Matching Original Bovidae Size)	1169	140

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Comparison of Testing Metrics

Training Data: Bovidae (argali sheep, bison, buffalo, cow, sheep) + Cervidae (moose, deer) (Reduced Size)

Testing Data: 100 randomly selected antelope images (set kept constant throughout testing models)

	Bovidae	Bovidae + Cervidae (reduced)
coco/AP:	0.724	0.774
coco/AP .5:	0.935	0.958
coco/AP .75:	0.814	0.843
coco/AP (M):	0.492	0.731
coco/AP (L):	0.735	0.775

	Bovidae	Bovidae + Cervidae (reduced)
coco/AR:	0.748	0.795
coco/AR .5:	0.941	0.961
coco/AR .75:	0.833	0.858
coco/AR (M):	0.510	0.750
coco/AR (L):	0.760	0.796

AP - Average Precision, AR - Average Recall

Full AP10k

Comparison of Testing Metrics

Training Data: Full AP-10k (Reduced Size)

Testing Data: 100 randomly selected antelope images (set kept constant throughout testing models)

	Full AP-10k	Full AP-10k (reduced)
coco/AP:	0.805	0.730
coco/AP .5:	0.968	0.929
coco/AP .75:	0.865	0.821
coco/AP (M):	0.777	0.626
coco/AP (L):	0.806	0.733

	Full AP-10k	Full AP-10k (reduced)
coco/AR:	0.825	0.755
coco/AR .5:	0.971	0.936
coco/AR .75:	0.877	0.833
coco/AR (M):	0.800	0.650
coco/AR (L):	0.826	0.758

AP - Average Precision, AR - Average Recall

Comparison Between Reduced Subsets

Metric	Bovidae + Cervidae	Full AP-10k
coco/AP:	0.774	0.730
coco/AP .5:	0.958	0.929
coco/AP .75:	0.843	0.821
coco/AP (M):	0.731	0.626
coco/AP (L):	0.775	0.733

Metric	Bovidae + Cervidae	Full AP-10k
coco/AR:	0.795	0.755
coco/AR .5:	0.961	0.936
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coco/AR (M):	0.750	0.650
coco/AR (L):	0.796	0.758

Next Steps

- Finalize the poster, print out in advance, and get ready for presentation
  - Can prepare 30sec, 90sec, and 2 min speeches to cater to different audiences
- Continue work on similarity
  - Working on using ratios with the proposal given last week
- Catalogue the data
- Continue labeling

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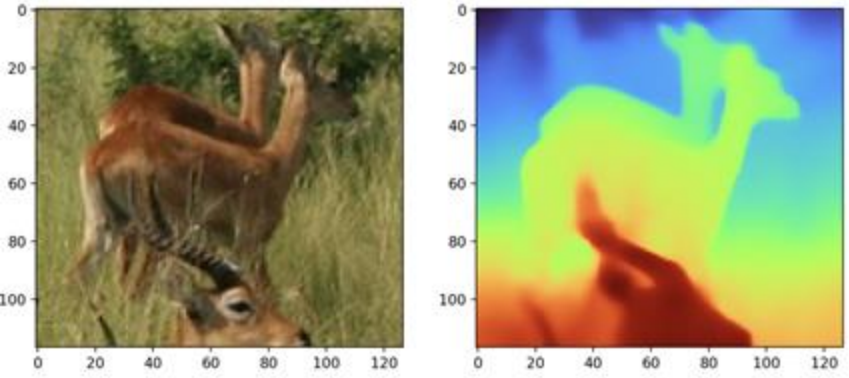
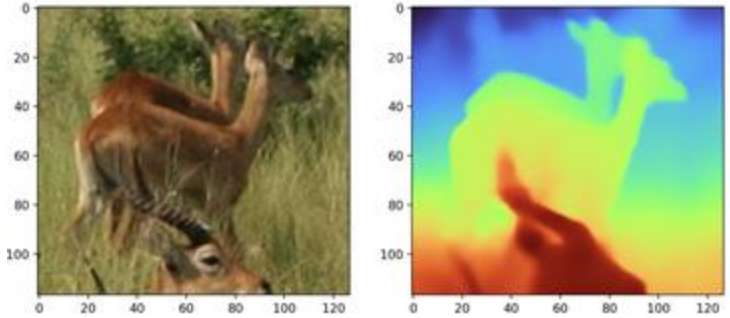
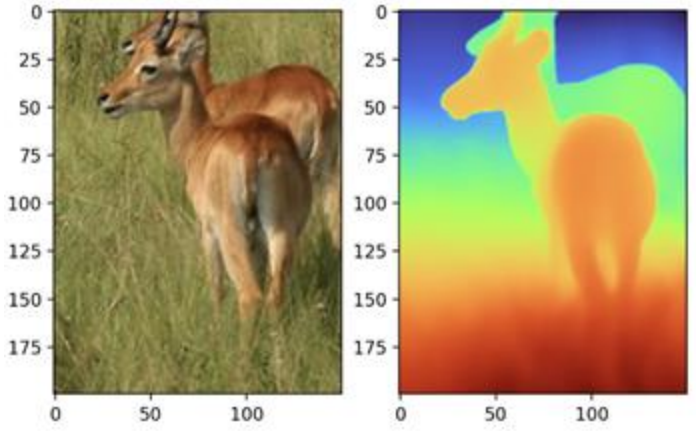
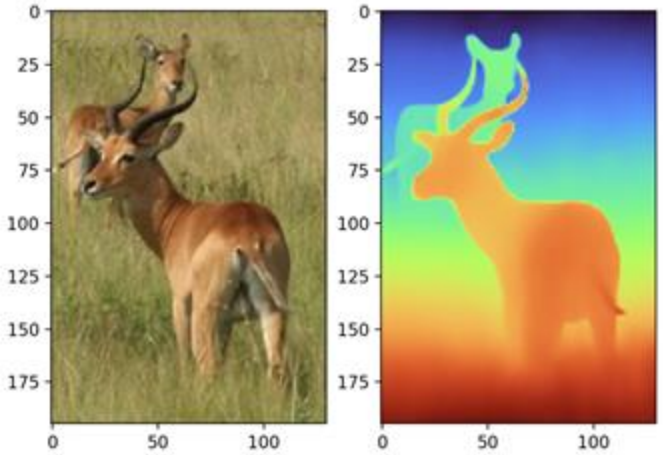
Depth Model Outputs on Occlusions









Personal Progress

Medha

- Tested Bovidae+Cervidae on antelopes
- Ran inferencing on antelope images to get visual analysis on both AP10k images and our image set
- Did some documentation on the coco metrics used
- Annotated Images with new keypoint definition
- Wrote up goals for the week

Claire

- Tested Full AP-10k (reduced training and validation annotations) on antelopes

Josh

- Did more research into how to use segmentation masks and depth information(from apple depth pro model) as a possible species similarity metric for evaluating similar "shaped" animals(curves in outline of the segmentation mask) and the muscularity of the animal(changes in depth inside the segmentation mask)
- Wrote the future work sections of the poster
- Annotated images with new keypoint definitions

Parth

- Did work on the poster about the implications of our project
- Did labeling (keypoints) with our new definition
- Present the goals for this week & next steps
- Some reading on future species similarity work, mainly cosine similarity to understand the math behind it

Armaan

- Wrote the overview section on the Poster
- Labelled keypoints with our new definition
- Researched on cosine similarity

Shaan

- Conducted additional testing to see how the Depth Pro model handles occlusions
- Labeled assigned images in label studio
- Wrote text on poster for the ‘Effect of Training Data’ section